

## NITROGEN (FIXED)—AMMONIA

(Data in thousand metric tons of nitrogen unless otherwise noted)

**Domestic Production and Use:** Ammonia was produced by 13 companies at 23 plants in 16 States in the United States during 2009; 5 additional plants were idle for the entire year. Sixty percent of total U.S. ammonia production capacity was centered in Louisiana, Oklahoma, and Texas because of their large reserves of natural gas, the dominant domestic feedstock. In 2009, U.S. producers operated at about 83% of their rated capacity. The United States was one of the world's leading producers and consumers of ammonia. Urea, ammonium nitrate, ammonium phosphates, nitric acid, and ammonium sulfate were the major derivatives of ammonia in the United States, in descending order of importance.

Approximately 89% of apparent domestic ammonia consumption was for fertilizer use, including anhydrous ammonia for direct application, urea, ammonium nitrates, ammonium phosphates, and other nitrogen compounds. Ammonia also was used to produce plastics, synthetic fibers and resins, explosives, and numerous other chemical compounds.

<b>Salient Statistics—United States:</b> <sup>1</sup>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009<sup>e</sup></b>
Production <sup>2</sup>	8,340	8,190	8,540	7,850	7,700
Imports for consumption	6,520	5,920	6,530	6,020	5,060
Exports	525	194	145	192	50
Consumption, apparent	14,400	14,000	15,000	13,500	12,800
Stocks, producer, yearend	254	201	157	368	300
Price, dollars per ton, average, f.o.b. Gulf Coast <sup>3</sup>	304	302	309	590	250
Employment, plant, number <sup>e</sup>	1,150	1,150	1,050	1,100	1,050
Net import reliance <sup>4</sup> as a percentage of apparent consumption	42	41	43	42	40

**Recycling:** None.

**Import Sources (2005-08):** Trinidad and Tobago, 55%; Canada, 14%; Russia, 14%; Ukraine, 10%; and other, 7%.

<b>Tariff: Item</b>	<b>Number</b>	<b>Normal Trade Relations 12-31-09</b>
Ammonia, anhydrous	2814.10.0000	Free.
Urea	3102.10.0000	Free.
Ammonium sulfate	3102.21.0000	Free.
Ammonium nitrate	3102.30.0000	Free.

**Depletion Allowance:** Not applicable.

**Government Stockpile:** None.

**Events, Trends, and Issues:** The Henry Hub spot natural gas price ranged between \$2 and \$6 per million British thermal units for most of the year. Natural gas prices declined for most of 2009 and began an upward trend in September. Higher prices may be a result of increased demand for natural gas because of colder temperatures and an increase in crude oil prices. The average Gulf Coast ammonia price gradually increased from \$210 per short ton at the beginning of 2009 to a high of around \$350 per short ton in October. The average ammonia price for the year likely will be about \$250 per short ton. The U.S. Department of Energy, Energy Information Administration, projected that Henry Hub natural gas spot prices would average \$4.89 per million British thermal units in 2010.

A California-based company planned to build a \$105 million bioammonia plant near Menlo, IA, by late 2011. The plant was expected to use 118,000 tons per year of corncobs to produce 45,000 tons per year of ammonia. This would be the first plant in the United States to use corncobs as feedstock to produce ammonia.

Plans to activate a portion of a urea ammonium nitrate production facility in Pryor, OK, were underway. Although the plant primarily will be producing urea ammonium nitrate, approximately 32,000 tons per year of ammonia was expected to be produced at the plant. The estimated cost to activate the Pryor facility was between \$15 and \$20 million. The plant had been idle for several years because of high natural gas prices.

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Several companies have announced plans to build new ammonia plants in Algeria, Qatar, and Uzbekistan, which would add 3.4 million tons of annual capacity within the next 2 to 3 years. Many of the ammonia plants that were idled in late 2008 as a result of the economic slowdown were back online in early 2009.

According to the U.S. Department of Agriculture, U.S. corn growers planted 34.4 million hectares of corn in the 2009 crop year (July 1, 2008, through June 30, 2009), which was a slight decrease from the area planted in 2008. The decrease in plantings was principally in response to lower corn prices in comparison to record highs in 2007, and unstable input costs were discouraging some growers from planting corn. Corn plantings for the 2010 crop year, however, were expected to increase to 35.6 million hectares. Corn acreage is expected to remain at historically high levels owing in part to continued U.S. ethanol production and the U.S. corn exports in response to a strong global demand for feed grains.

Nitrogen compounds also were an environmental concern. Overfertilization and the subsequent runoff of excess fertilizer may contribute to nitrogen accumulation in watersheds. Nitrogen in excess fertilizer runoff was suspected to be a cause of the hypoxic zone that arises in the Gulf of Mexico during the summer. Scientists continued to study the effects of fertilization on the Nation's environmental health.

### **World Ammonia Production and Reserves:**

	Plant production		Reserves <sup>5</sup>
	2008	2009 <sup>e</sup>	
United States	7,850	7,700	Available atmospheric nitrogen and sources of natural gas for production of ammonia are considered adequate for all listed countries.
Bangladesh	1,300	1,300	
Canada	4,780	4,500	
China	44,000	44,000	
Egypt	1,750	3,000	
Germany	2,820	2,800	
India	11,100	11,100	
Indonesia	4,500	4,600	
Iran	2,000	2,000	
Japan	1,110	1,000	
Netherlands	1,800	1,800	
Pakistan	2,300	2,300	
Poland	2,000	2,000	
Qatar	1,800	1,800	
Romania	1,300	1,300	
Russia	10,400	10,400	
Saudi Arabia	2,600	2,600	
Trinidad and Tobago	5,130	5,150	
Ukraine	4,000	3,000	
Other countries	20,400	20,400	
World total (rounded)	133,000	133,000	

**World Resources:** The availability of nitrogen from the atmosphere for fixed nitrogen production is unlimited. Mineralized occurrences of sodium and potassium nitrates, found in the Atacama Desert of Chile, contribute minimally to global nitrogen supply.

**Substitutes:** Nitrogen is an essential plant nutrient that has no substitute. Also, there are no known practical substitutes for nitrogen explosives and blasting agents.

<sup>e</sup>Estimated.

<sup>1</sup>U.S. Department of Commerce (DOC) data unless otherwise noted.

<sup>2</sup>Annual and preliminary data as reported in Current Industrial Reports MQ325B (DOC).

<sup>3</sup>Source: Green Markets.

<sup>4</sup>Defined as imports – exports + adjustments for Government and industry stock changes.

<sup>5</sup>See [Appendix C for definitions](#). Reserve base estimates were discontinued in 2009; see [Introduction](#).